

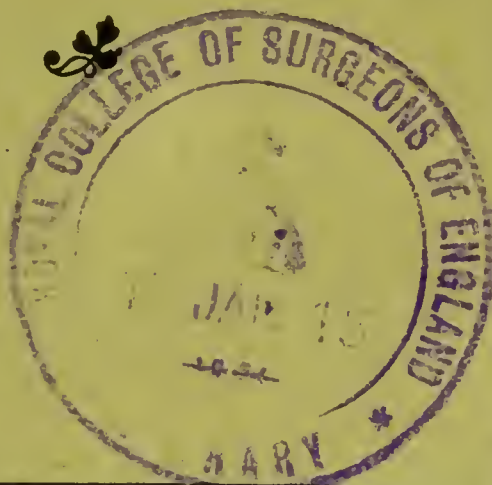
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**THE EFFECTS OF GOITRE OPER-
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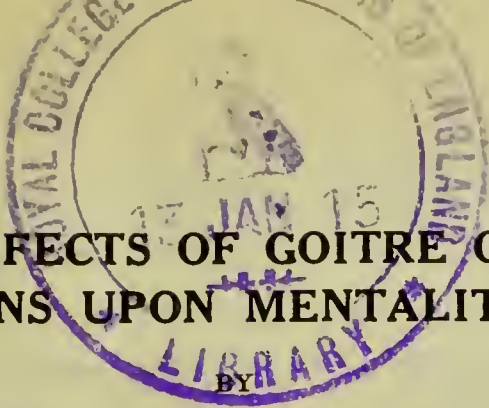
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THE EFFECTS OF GOITRE OPERATIONS UPON MENTALITY.¹

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Introductory Remarks.—A diseased condition of the entire body, characterized by the presence of symptoms due to the absorption of an excessive amount of thyroid secretion, with or without enlargement of the thyroid gland, suggests the diagnosis of the disease commonly known as “exophthalmic goitre,” “Grave’s disease,” or “Basedow’s disease.” Inasmuch, however, as many of these patients exhibit no prominence of the eyes, the reference to exophthalmos in the naming of the disease is inaccurate and misleading. Needless to say, the attachment to the name of a disease of the name of an individual, however important his observations in this connection may be, is unscientific and unfortunate.

In view of the fact that the exhibition of symptoms due to the introduction of thyroid toxins into the system characterizes the clinical picture in these cases, the term

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“systemic goitre” appears to me to be a fitting designation for this disorder, which is seemingly of true autotoxic origin. This term will therefore be employed as synonymous with hyperthyroidism and dysthyroidism—increased or perverted thyroid secretion affecting the entire body, with local enlargement of the thyroid gland as a matter of secondary importance.

Systemic goitre is characterized by increased frequency of action and palpitation of the heart, protrusion of the eyeballs, tremor, and a number of diseased mental and nutritional disturbances. All these symptoms may be present, or one or more may be absent. Under the term of infantile athyreosis Quincke described certain states of arrested mental development, with trophic disturbances of the teeth, which differ from cretinism by the normal or even hypernormal growth in length, and the later onset of the disease.

The benign hypothyroidism or myxedema fruste, of Hertoghe, is a transition stage between pronounced myxedema and the normal condition. In this observer's opinion there is hardly a symptom or symptom complex which cannot be traced to the incomplete function of the thyroid gland. A long series of neurasthenic and vasomotor disturbances were referred to this organ by Levy and Rothschild. Saen-

ger pointed out the occurrence of abortive forms of myxedema in which cardinal symptoms such as cutaneous changes are absent, and the psychic changes are not well marked.

The mental condition of patients suffering from systemic goitre is hardly ever normal. The neuropathic diathesis is revealed by a number of manifestations. Disturbances of the nervous and psychic equilibrium are not uncommonly among the first signs of the incipient disease. Excessive irritability, excitement, forgetfulness, restlessness and absent-mindedness, are characteristic of practically all cases, the psychic disturbance being outwardly betrayed, as a rule, in the facial expression and the behavior of the patients. They are apt to be timid women, easily frightened and ill at ease, restless and fidgety, prone to involuntary movements which express their embarrassment and lack of poise. Their statements may be inaccurate and contradictory, with frequent lapses in memory. The degree of the disturbance varies greatly in individual cases, as well as in the different stages of the same case.

Disturbances of sleep, from restless, interrupted slumber, often with vivid dreams, up to complete insomnia, are among the most distressing symptoms of the disease, and naturally react most unfavorably upon

the physical as well as the psychic well-being of the patient. Other cases are characterized by a peculiar drowsiness, and Oppenheim observed some goitre patients who slept so soundly that they could not be aroused. Kocher refers to a case of somnolence in a woman thirty-one years of age who was suffering from the disease.

A specific psychosis of systemic goitre apparently does not exist. Clear-cut mental aberrations, under the definite picture of melancholia, mania, or catatonia, are not so common as transitions into atypical or mild forms of dementia, which have been occasionally noted in the course of the disease. The psychosis is usually persistent, although it has been known to subside while the disease itself remained stationary or even became aggravated.

Oppenheim mentions a patient who suffered from grave systemic goitre, associated with disturbances of speech and a psychosis having the character of toxic delirium. The diagnosis of general paralysis had been rendered by an experienced psychiatrist. Operative treatment of the goitre was recommended by Oppenheim, and led to the cure of the entire affection.

According to the majority of modern investigators, more particularly operating surgeons, headed by Kocher, this disease is due to an increased activity of the thy-

roid (Moebius) or an abnormal function (Gauthier), or a combination of increased and perverted glandular function. Recently some astonishing results have been secured by Sir Arbuthnot Lane through treating this condition as due to an underlying intestinal stasis. This authority holds that the absorption of effete products from the intestinal tract is the basis of this as well as of many other maladies. Others have interpreted the condition as a dys-thyreosis, through iodine poisoning, the organ having lost the capacity of storing the iodine as iodothyron, in the normal manner (Klose).

A very important part in the production of the mental disturbances noted in patients with systemic goitres, undoubtedly belongs to the exaggeration or perversion of thyroid function. Practically all patients having the disease have an unstable nervous equilibrium, and their psychic condition suffers accordingly. This is not surprising in view of the known fact that the thyroid secretion affects the nutrition of all parts, including the brain. Disturbances on the part of the digestive apparatus have been enumerated among the leading symptoms of the disease, both in regard to their frequency and their pronounced effect upon the duration of the trouble. In certain cases, diarrhea is one of the incipient symp-

toms, and may be followed by a period of rebellious obstipation, as an expression of intestinal atony.

Although there exist theories in plenty concerning the mutual relations between the thyroid and other glands with an internal secretion, such as the parathyroids and the suprarenals, the available data are still too unreliable and contradictory to justify a prolonged discussion of these teachings. A number of facts have also been ascertained, without definitely establishing the part played in goitre cases by the thymus, which during the time of its physiological development represents a vital organ of special significance for the nervous system. Hypertrophy of the thymus in these cases is probably a compensatory process, an excess of which may in turn involve dangers for the organism. The mutual relations between the thyroid, the pancreas and the suprarenals, have been explained as being of an inhibitory character between the pancreas and the thyroid, while the relation between the suprarenals and the thyroid has been interpreted as antagonistic by some, and as synergistic by others.

The influence of the thyroid changes upon the psychic condition was investigated by Ramadier and Marchand, who examined the thyroid glands of many deceased insane

individuals. Aside from cretinism and myxedema, no causative connection could be established between the demonstrable changes of the thyroid parenchyma and the various forms of mental aberration. This dependence is usually traced simply through the action of thyroid extract upon the patient, whereas the conclusions of the French investigators are based upon their personal observations on all sorts of mental aberrations, such as acute confusional insanity, chronic dementia, mania, melancholia, dementia precox, senile dementia, progressive paralysis, epilepsy, organic brain disease, etc. The glands were weighed and the macroscopical as well as the microscopical findings were carefully noted. Considerable fluctuations in the weight of the organ were apparent, but the same holds good for normal individuals. No connection could be established between the weight of the thyroid, and the various types and degrees of mental impairment; nor did the gross findings indicate any relation between thyroid change and insanity. The microscopical examination repeatedly showed the existence of circumscribed sclerotic or atrophic foci and of parenchymatous or interstitial inflammations in the thyroid tissue. These changes were found, however, both in mentally normal and mentally unsound individuals, and similar anomalies in the

thyroid glands were noted in different varieties of mental disease. Moreover, the changes of the glandular tissue were not expressed by the functional disturbances during life. The investigators suggest, on the basis of their findings, that injurious factors, such as toxins, or other poisons which are capable of affecting the brain and thereby producing a mental disturbance, are capable of attacking the thyroid gland at the same time.

The manifestations of the malady are usually charged to the excessive functional activity of the gland. The onset in most patients is insidious, but it may be acute, especially after violent emotions, and it can usually be shown that a neurasthenic or hysterical stage has preceded the development of the symptoms.

Local goitre or struma, by which is meant an enlargement of the thyroid gland as a whole or of some individual part, without an increase or change of the internal secretion, does not enter into the present consideration.

Surgical Treatment.—Through the better understanding of systemic goitre and the improved technic, the surgical treatment of the disease has been so greatly advanced in the last twenty years that after a long period of hesitancy operative intervention is now very widely recommended in these

cases. Surgery has certainly proved superior to internal measures, for, as pointed out by Oppenheim, although there are several useful medical remedies, none can be relied upon. While the outcome of medicinal treatment is extremely problematical, especially in regard to the psychic symptoms, surgical interference upon goitres, provided a sufficient quantity of secreting glandular parenchyma is preserved, almost invariably relieves in whole or in large measure the common emotional disturbances of these patients.

The surgical treatment of systemic goitre, in the form of partial strumectomy, is conceded by Oppenheim to be a legitimate and efficient procedure, which should not be postponed until the terminal stages of the disease, nor be restricted to the gravest cases. The operation was recommended by him in about twenty-five cases, in the course of the last few years, some of these cases concerning patients who were on their way to Kocher and simply desired advice as to the necessity for surgical treatment. Although only a small number could be examined before and also after the operation, it could be ascertained in eleven cases that the curative result was perfect and extended over several years. The persistence of the cure at the end of nearly thirty years after the operation could

be established in one instance by Rehn. The most striking and immediate results of operative interference in many cases consists precisely in the improvement of the mental symptoms and the relief of the nervous disturbances.

After operations upon goitres, previously restless patients are often soothed and quieted. Individuals who for a long time have been confused, apathetic and introspective, are aroused to attention concerning their surroundings, again become interested in their work, or ask for some occupation while still in the hospital. Even established nervous diseases of long standing, such as hysteria, epilepsy or chorea, sometimes undergo marked improvement after goitre operations. Unfavorable post-operative conditions which represent an exacerbation of long standing nervous symptoms, in predisposed individuals, cannot of course be charged to the operation itself. Chronic psychic disturbances through thyroid insufficiency, which have been described in the past as an occasional sequel of goitre operations, may be said to occur exclusively in consequence of total extirpation of the gland, a procedure which, needless to state, has now been abandoned, except in malignancy. Partial strumectomy, first performed by Tillaux and Rehn, is at present the procedure of election.

The value of surgery in goitre cases has been especially advocated by Kocher, on the basis of his constantly improved results. His procedure consists in a combination of partial strumectomy with arterial ligation, preceded by a preliminary course of treatment for quieting the nervous system, especially in patients with considerable excitement and acceleration of the pulse. The indications are extended by him so that nearly all patients with systemic goitre are advised to submit to operation, unconditionally so in the incipient or mild cases, while in the graver cases an operation in several sessions may be required. Avoidance of general narcosis, omission of all disinfectants, and careful hemostasis, are insisted upon. The outcome depends upon the amount of goitre tissue which has been removed and the quality of the glandular parenchyma which is left behind.

It has been shown that in consequence of the psychic excitement incident to the operation, the thyroid secretion may be modified both as to quantity and quality. Such patients have been known to die in collapse while being prepared for the operation. Crile's anoci association method of preventing shock in these cases has lately been adopted by a number of surgeons. The essence of orange-ether sequence, as recommended by Gwathmey, acts very

beneficially. A mixture of ether in olive oil, administered by rectum, has very recently been advocated by Gwathmey, and employed by him in over a hundred general surgical cases.¹ According to his experience this method amply fulfils all conditions of anoci association, as enunciated by Crile. In the judgment of Berry, simple open-ether anesthesia, with a preliminary small dose of atropin hypodermatically administered, is all that is necessary in the vast majority, the results obtained being fully as good as with any other method.

In this connection it is interesting to note that depressing emotions or severe fright under all circumstances have a very unfavorable effect upon the course of the disease, and may cause a sudden exacerbation of systemic goitre. Acute attacks, later becoming chronic, have been known to develop as the immediate sequel of psychic disturbances. In a case described by Rahel Hirsch, a young, previously healthy girl was attacked by palpitation of the heart, anxiety and insomnia, directly after a psychic shock induced through a visit to the morgue. At the same time her mother noticed a marked prominence of the eyes and a swelling at the neck. The condition

¹The ether in oil method I have employed so far myself in two goitre cases and in both the anesthesia was perfectly satisfactory.

developed into a typical case of systemic goitre. Cases have been reported, on the other hand, in which a happy event or a cheerful frame of mind has ushered in a spontaneous improvement or the subsidence of all symptoms. Peace of mind and rest of body are the primary considerations in the treatment of the disease. Empirically, the rest treatment is still advocated by a number of physicians, although of course it cannot alone remove real pathological changes of the gland. Complete mental and physical rest alone has relieved symptoms. An icebag applied for a half hour once or twice daily in the experience of a number of observers, including the writer, has proved a real benefit. Some patients have been helped by the topical use of electricity.

Surprisingly prompt effects are often noted after goitre operations, part of the most distressing symptoms disappearing in short order, although a preexisting psychosis may not be markedly benefited. It is not to be expected that the operation, although it removes the determining factor, should also influence the psychic degeneration when it is already well established. In some cases, the relief afforded by the operation is almost instantaneous, improvement manifesting itself within a few hours, while in other cases more or less time, sometimes six months up to an entire year, may elapse

before the full curative effect is established.

The permanent results of radical versus conservative treatment, in systemic goitre, were investigated by Baruch, in 1911, upon a material of 164 cases; including 51 operations and 39 cases treated by conservative methods, divided between ninety cases concerning whom later information could be obtained. He personally reexamined 48 of these patients; detailed professional statements were available in six other cases, and the patients' own statements had to be relied upon in six cases. Nine patients died as the immediate result of the operation, but among the 51 survivors, there was not a single subsequent death from this disease. As regards the permanent results of conservative treatment, it is a noteworthy fact that not a single patient was cured. The superiority of surgical as compared to internal treatment was illustrated by the results in general, as well as by the effect upon the special symptoms in particular. Among 40 reexamined cases, 15 cases (37.5%) were cured; 14 cases (35.5%) were considerably improved; and 5 cases (12.5%) were moderately improved; there was no improvement in 6 cases (15.0%). Concerning fitness for work, only four among forty cases had to be designated as unable to work; this inability being due in two cases exclusively to grave changes in

the eyes. Seven patients were not entirely fit for work. The number of patients conditionally fit for work far surpassed the number of cases described as successful operations or as perfect cures.

A patient who, fifteen months previously had been operated upon for systemic goitre, was presented by Englaender, in 1910, before the Vienna Medical Society. Although a few of the symptoms still persisted, such as the tachycardia, this patient had not had a day's illness since resuming his business, two months after the operation.

In order to obtain the remote results of operative interference in systemic goitre, Alamartine and Perrin, in 1911, examined the compiled statistics of many operators, utilizing only those cases which remained under observation for at least three years after the operation. Among 120 patients, 85 (70.8%) were completely cured; and 27 (22.0%) were considerably improved; only 8 (6.6%) were not improved. In the Zurich Clinics, service of Professor Kroenlein, the post-operative psychic condition of the patients was highly satisfactory throughout; several volunteered the statement that they had become changed human beings, since the subsidence of the distressing dyspnea. None showed the dreaded symptoms of tetany or of cachexia strumi-

priva. In four somewhat idiotic patients, the strumectomy had no effect on the mental condition, either in the sense of improvement or of aggravation.

Psychic symptoms which had existed for five years prior to the operation in a case of systemic goitre with mental confusion, reported by Delmas, in 1910, disappeared within three weeks after hemithyroidectomy. On the basis of his observation of two cases of catatonic dementia precox, Davidenkoff concludes that partial thyroidectomy, or strumectomy, respectively, is entitled to serious consideration in this form of mental disease. Both these operations were followed within the first week by improvement, especially of the motor disturbance.

In pointing out the remarkable advance which has been achieved during the last two decades, in the operative treatment of systemic goitre, Mayo recently (1912) states that the estimated proportion of cures, based on the examination of patients operated upon and from letters and reports, is about 75%. "These patients have been restored to usefulness, resuming former occupations, and are free from nearly all former symptoms."

The vast majority of goitre cases are surgical, and no untoward effect upon the patient's mentality, either temporary or per-

manent, need be feared. Remote psychic effects are largely due to improper choice of the operative procedure and to faulty surgical technic. The author's experience with these cases and his observation of others have been such as to make him feel that the results can be very efficiently controlled by appropriate preliminary care, correct technic, judicious selection of the time of operation, and last, but not least, the proper post-operative attention. The occasional injurious hypersecretion on the part of the thyroid gland, or worse, the escape of a perverted secretion into the tissue, after goitre operations, can be lessened or prevented through a good technic. By carefully guarding against the glandular congestion, before and after the operation, the danger of interventions upon goitres affecting the mentality of the patient is practically eliminated.

At the present writing, the effect of the internal secretions, notably of the thyroid, upon the psychic, can no longer be denied. This organ has been designated as the "emotional gland" (*glande de l'emotion*) by Leopold-Levi and Rothschild. Cases have been placed on record in which there was a distinct parallelism between the systemic goitre and the mental disturbance, the psychosis increasing with the aggravation of the bodily ailment and disappearing through

its cure after operation. The patient observed by Delmas suffered from systemic goitre, associated with periodical attacks of fever, convulsions, hallucinations, and a confusional state. Treatment was operative and consisted in the removal of one lobe of the gland. The outcome was not only a cure of the thyroid affection, but the psychosis likewise disappeared three months after the operation. In a similar case described by Horand, Puilliet and Morel, in 1912, the patient developed a psychosis in form of hallucinations, delirium and delusions of grandeur, associated with the rapid growth and degeneration of a goitre. The mental disturbances subsided within a few days after the operative removal of the goitre.

Prior to the performance of any operation, the toxic symptoms of systemic goitre affect all the important functions of the organism. The mental disturbance associated with this disease is known in Germany as Basedow's psychosis, and as such was recently discussed by Colla (1913). The rudimentary forms are the result of a relatively mild, hyper- or dysthyroidism, which affects circulation and nutrition. Hypertrophy of the gland is hardly noticeable in these cases, exophthalmos is frequently absent, and the disease manifests itself especially by tachycardia, nervous-

ness, tremor, and a peculiar brilliance of the eyes. The psychic disturbances in the fully developed as well as in the mild cases, although extremely variable in degree, are all seemingly due to intoxication, for they are the first to be improved by surgical interference in the form of partial thyroidectomy. The relief of the psychic symptoms is followed by an amelioration of the nutritional disturbances which have been present in the form of vomiting, diarrhea, profuse perspiration, increased urinary toxicity, and rapid loss of weight.

Surgical interference usually cures all early goitre cases, when the heart or kidneys are not seriously involved. Partial thyroidectomies under these conditions are likely to yield a very large percentage of cures, and a permanent improvement of the psychic symptoms may be counted upon with more than a high degree of probability. Systemic goitre usually belongs to the surgeon's domain, with conditional excursions into the field of the internal clinician.

The post-operative course of favorable cases—and under an improved technic, with better understanding of the relations of a persistent thymus, perhaps all cases will become favorable—may be divided into two stages. The first consists in the disappearance of the toxemia, shown by the

immediate and prompt improvement of the psychic disturbances under which the patient has been laboring, and also in a welcome relief of the troublesome tachycardia. The nutrition and general condition are likewise improved, the digestive disturbances subside, and the patient gains in weight. The progressive improvement of the objective symptoms continues in the second stage, and gradually terminates, when all goes well, in the recovery of the patient with a healthy mind in a healthy body.

Interesting experiments have been conducted with reference to homioplasic transplantations in the effort to combat thyroid insufficiency or hypothyroidism. The failures or merely temporary results in these cases are probably due to biochemical differences, as thyroid autotransplantations or reimplantations with vascular sutures have yielded excellent results in the animal experiments of Borst and Enderlen, and others. Bircher reported implantations of thyroid gland segments into the cervical connective tissue of cretins. The material was obtained from apparently healthy goitre tissue of youthful individuals, and was implanted into the subcutaneous cellular tissue, where it healed in and for some time could be palpated under the skin of the neck. At the end of seven

to twelve weeks, no trace was left of the implanted graft. The psychic condition of the patients had remained unchanged throughout. Three thyroid transplantations in cases of cretinism, or myxedema, respectively, which were performed in the clinics of von Eiselberg, also remained unsuccessful. The highly satisfactory results which at first followed upon Payr's successful transplantation of a piece of the mother's healthy thyroid into the spleen of a six year old female cretin with severe infantile myxedema, were not permanent. Two years later, after the child had grown considerably in length, and had also begun to walk and talk, the somatic improvement progressed at a much slower rate, and the patient's condition actually became aggravated from the psychical point of view.

As pointed out by Kocher, the procedure of Payr is technically difficult and somewhat discouraging. He proposes instead the transplanting of thyroid material into the spongiosa of bone, namely in the metaphysis, the name applied by him to the portion of the bone adjacent to the epiphyseal line. The advantage of this site of transplantation is the highly vascularized but nevertheless resistant character of the tissue, in which a pocket of any desired size or shape may be applied for the imbedding of a piece of thyroid gland in such a way

that it exactly fits the space and comes to lie in direct contact with the finest blood vessels, thus favoring the establishment of vascular connections between the natural and the newly inserted tissue. The outcome depends upon the quality of the transplanted gland, which, needless to say, should be as nearly normal as possible. The effects obtained with this procedure in animal experiments are suggestive of its potential results in human beings suffering from thyroid insufficiency.

The writer has transplanted thyroid grafts into little cretins with usually distinct improvement, which, however, proved only temporary. The transplanted tissue was put deep in the neck, or close to the internal mammary artery in the epigastrium on the peritoneum, or above the kidney in relation to the adrenals. After a time the thyroid graft became atrophic and the improvement in mentality and otherwise ceased.

The thyroid tissue does not seem to remain as a functioning organ, although it survives for a short time when transplanted in these various ways. Before discontinuing this line of investigation it seems well worth the while to try a series of cases where direct vascular transplantation is performed. The vessel-to-vessel method, pro-

viding for better nutrition of the graft, may prove of permanent value.

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